provides information about the position or state of virtual slider **502** and the parameter it is controlling. Slider **502** may be manipulated by a finger or a cursor. Other UIs may provide a slider that is laid out in a up/down orientation or might be rotational such as a knob or wheel.

[0028] UI **500** has a minimum and maximum setting, and in one embodiment a dynamic haptic effect is generated that has an increasing magnitude as the volume is increased and a decreasing magnitude as the volume is decreased. This type of haptic effect helps communicate the relative volume of the parameter being increased/decreased, whether it is an audible volume from a stereo system or a physical volume such as for an industrial flow control system managing liquid volumes. In addition, positional haptic effects may be generated that simulate bumps or dents that might be used as slider end-stops, a centering location, or other important positional locations in the slider that might be specific to the end-user application being controlled (e.g., positions **504** and **506**).

[0029] FIG. **6** is a flow diagram of the functionality performed by telephone **10** of FIG. **1** in accordance with one embodiment in response to the movement of a slider. At **602**, processor **12** receives an indication the slider has moved and an indication as to whether the parameter (e.g., volume) is decreasing or increasing. At **604**, in response to the parameter increasing or decreasing, a dynamic haptic effect is generated that has an increasing or decreasing magnitude or other parameter.

[0030] In another embodiment, slider **502** is a toggle type slider that has only two resting positions or a limited number of positions, such as an on/off switch. In this embodiment, the haptic effect is generated to confirm the action of the toggled control. Further, two or more distinctly different haptic effects can communicate to the user into which state the slider has been placed, such as on/off, slow/medium/fast, etc. The differences in the haptic effect may be a varied magnitude, frequency, duration or any combination of these three parameters.

[0031] In another embodiment, telephone **10** generates haptic effects during screen transitions. The haptic effects in one embodiment are synchronized with any visual transitions occurring on screen. Examples of screen transitions that may generate haptic effects include changes in screen orientation where the on-screen content rotates, content being replace with new content through screen fades, wipes, dissolves or other video transition techniques, changes in viewing size such as zooming in or out, panning of content such as web pages, pictures or documents, etc. In one embodiment, the haptic effect will be generated during the screen transition, and a different haptic effect can be generated when the screen transition is completed

[0032] In another embodiment, haptic effects are generated when a user drags selected text or other items across a touchscreen. A haptic bump, pop or tick may be generated during the drag. This haptic effect could be played over each letter selected and a different, possibly stronger, effect could be played as whole words are selected in order to confirm both individual letter and whole word selections. Further, a haptic effect may be generated as each individual object becomes selected during the dragging. Further, while dragging an object or otherwise moving a finger across a touchscreen, a haptic effect can be generated to simulate the "surface" of the screen. For example, if the screen is displaying a bumpy road, the haptic effects can be generated so that it feels as if the finger is dragging across a bumpy road.

[0033] In another embodiment, a haptic effect such as a bump, pop or tick could be generated as a user click-drags his finger or cursor across multiple objects like words, files, directories, pictures, icons, etc. In one embodiment, the haptic effect would be generated as each individual object became selected or deselected from the grouping while dragging. This selection method could be accomplished with both single and multi-touch touchscreens.

[0034] In another embodiment, a haptic effect such as a bump, pop or tick could be added as a user double-taps his finger or double-clicks a cursor to select words. This confirmation method could be used when triple-tapping or triple-clicking to select whole sentences or paragraphs.

[0035] In some embodiments, a user is forced to wait while a device such as telephone **10** initializes, downloads content, etc. During this time the UI generally cannot be interacted with and any time spent attempting to interact is wasted. In one embodiment, a haptic effect is generated to inform the user that the device has entered or has exited a loading/standby state that causes the user to wait.

[0036] In one embodiment, the haptic effect while the UI is unresponsive is a subtle, constant effect having a non-changing magnitude or frequency that simply ends when the UI becomes available again for interactions. In another embodiment, the haptic effect is a dynamic effect that increases in magnitude and/or frequency as the system progresses towards completion of its task. Further, in one embodiment a separate confirming completion haptic effect can be generated, such as a bump, pop or tick when the UI becomes available again.

[0037] In another embodiment, a gesture from a user on touchscreen **11** can be used to unlock content that has previously been locked by device **10**. Device **10** can be unlocked when a predetermined gesture is input by the user. For example, the gesture can function as a password or pass code to unlock the menu system of device **10**. Examples of a predetermined gesture includes a swirl, swipe, press/tap pattern, or any combination of these gestures.

[0038] In one embodiment, a haptic effect is generated that corresponds to or is a representation of the gesture so the user may confirm the gesture or learn the gesture. The haptic effect can be dynamic and may be applied to individual portions of touchscreen **11** at a time in order to simulate directional motion such as a circular motion. This especially has value when the gesture is a substitute for a pass code and the user needs to memorize the gesture in order to access device **10**. Without the haptic effect, gestures such as a swipe, swirl or tap pattern may be reviewed/confirmed by replaying the gesture with visual and/or audio representations of the gesture. However, the haptic effect can aid the user in remembering the gesture pass code better than with only visual and/or audible cues, especially with a gesture that may include finger pressure data patterns generated by touchscreen **11**. The haptic effect can "simulate" the finger pressure data by changing the amplitude values of the haptic effect. The haptic effect may also be generated for a user who may have forgotten their gesture pass code—the playing of the haptic effect will serve as a reminder.

[0039] In another embodiment, the user gesture is used as a "hot key" or macro to bypass a number of steps to arrive at a desired menu or function. For example, swirling a user's finger clockwise on touchscreen **11** twice might indicate that the user wants to call home, or type a SMS mobile message. Device **10** would then bypass the standard menu selections that would otherwise be needed to be navigated and simply